

SUMMARY AND CONCLUSIONS

Population growth and economic development cause increasing nutrient releases to streams and estuaries from agriculture, urbanization, and industrialization. More nutrients enter headwater streams in North Carolina than reach the estuaries, partly because of removal by swamps and bottomlands which border Coastal Plain streams. These wetlands are thus interposed between the watershed nutrient sources and the estuarine sinks. These wetlands along streams, termed riparian wetlands, normally have wide, flat floodplains which provide large areas of soil surface for processing nutrient loads. Nutrients not removed from the streams before reaching the estuary contribute to nuisance algal blooms, hypoxic bottom waters, decreased fish and shellfish harvests, and other problems. The goal of this study was to increase understanding of the efficiency with which Coastal Plain riparian wetlands strip out nitrogen and phosphorus from municipal wastewater effluents.

The initial phase of this study was devoted to selection of sites representative of the forested wetlands receiving municipal wastewaters in eastern North Carolina. A preliminary list of 35 municipalities was provided by the N.C. Division of Environmental Management. This list was shortened and sites were ranked based on information gathered on field trips to the wastewater treatment plants and associated streams and wetlands. A one-day workshop with forested-wetland authorities of the Southeast provided perspectives useful in making final selection of study sites. The differences among the selected sites in the type of wastewater treatment, in the size and water quality of the receiving stream, and in the nature of the wetland system along the stream were representative of the variability in these factors in eastern North Carolina.

Two swamp-stream sites were selected for intensive study, Bridgers Creek which receives wastewater from the town of Rich Square, and Deep Creek which similarly serves Scotland Neck. Samples of water were collected at about ten stations above, at, and below wastewater outfalls every three weeks for two years. A more extensive study utilized seven additional sites near the towns of Clarkton, Pink Hill, LaGrange, Walstonburg, Enfield, Macclesfield, and Lewiston-Woodville. They were sampled only quarterly for one year to determine variability among bottomland systems. On the field trips, measurements were made of water temperature, conductivity, dissolved oxygen, and pH. At the two intensive sites, stream discharges were also estimated. Grab samples of water were collected and returned to the laboratory for measurements of chloride, nitrate, ammonium, total N, phosphate, and total P